

# A Pond Designed for the Future

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**At first, the retention basin in Gargždai was planned with a single purpose in mind: preventing floods. But long-term climate projections suggest that Lithuania, too, will not only face more intense rainfall, but also longer dry periods. So the planners decided to think a step ahead and ask how the stored water could be used – and in doing so, they turned the town into a national pioneer in water recycling.**

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Lithuania is not a dry country, and water is not a scarce resource here – at least not yet. Anyone driving through the green summer landscape around the town of Gargždai, near Klaipėda, can see that immediately. So why even start talking about water recycling here in the Baltics? The answer lies in a rather inconspicuous earth embankment on the edge of town. Behind it stretches a new body of water fringed with reeds: a retention basin built for flood control – but designed to do far more.



*Retention pond in Gargždai*

The starting point for the pilot measure could be called quite conventional. The municipality of Gargždai was struggling more and more with incidents of flooding. Climate change was already making itself felt in the form of frequent heavy rainfall, and the mixed-

use sewer system dating from Soviet times was often overloaded. A retention pond was intended to cut peak loads and ensure that water could be discharged in a controlled way. This also became the starting point for Gargždai's participation in the WaterMan project, which focuses on new approaches to water management in the Baltic Sea Region under climate change.

However, the collaboration that followed between the municipality, Klaipėda University and the association "Klaipėda Region" soon broadened the perspective. Professor Valdas Langas and his team asked a crucial question: if the long-term climate data already indicate an increase in drought periods in our region, why not address this development and design the retention pond from the outset in such a way that water can be extracted and used?

## In Lithuania, this made Langas and his team pioneers

It was this forward-looking shift in perspective that turned a retention pond project, initially focused mainly on flood control, into a pioneering initiative. At least on a national level, Langas and his team were now leading the way. Because water had never really been scarce in Lithuania, the topic of water recycling had attracted little attention so far. This was now about to change. “We didn’t just want to drain the water away; we wanted to treat it as a resource – to make it usable,” explains Langas.

The idea was to create a multifunctional basin that would both protect against flooding and provide an alternative source of water, for instance for cleaning sewers, as a reserve for firefighting, and for irrigating parks and urban trees. The latter alone currently use around 300 m<sup>3</sup> of drinking water per year, obtained from groundwater – the equivalent of about 1,500 filled bathtubs. In rainy Lithuania, that figure may not seem dramatic at first, but it is avoidable. And in view of increasing summer droughts around the Baltic Sea, avoiding this consumption may also become much more urgent in Lithuania in just a few years’ time. Langas and his team made sure that, by then, Lithuania will not have to start from scratch.

## Pioneering work – above all in the legal framework

When it came to the construction of the pond and the technical implementation of water recycling, the team could draw, among other things, on the experience of WaterMan partners in Västervik in Sweden, who have been building “multi-dams” with water extraction options for years. Close professional exchange was also invaluable regarding monitoring strategies, testing parameters and operational issues.

Where the retention pond in Gargždai truly broke new ground was in terms of the legal framework in Lithuania. “Water recycling has not yet been formally anchored in Lithuanian legislation,” says Mindaugas Šatkus, who oversaw the project for the municipality together with his colleague Feliksas Žemgulys. Before the first excavator could move in, the two of them had to create a legal foundation. “There were some fundamental questions that had to be clarified – legally, technically and organisationally,” adds Langas.

EU Regulation (EU) 2020/741 does apply in Lithuania to agriculture and municipal wastewater, but how it should be applied to rainwater and municipal non-agricultural uses is not yet defined. For Gargždai, this meant many discussions, a lot of awareness-raising, and the courage to be the first municipality to build practical experience. Thanks to Mindaugas and Feliksas, the groundwork was completed quickly – and soon the excavators could roll in.

## A textbook example of nature-based rainwater treatment

Since early 2025, the new retention pond has been in place. It is located in a well-used area near a football pitch and the Jewish cemetery, right in the middle of a popular local recreation zone. Its design follows the textbook principles of nature-based rainwater treatment: the main basin is preceded by a sedimentation forebay.

This is one of the features distinguishing the pilot measure in Gargždai from the multi-dams in Västervik. Valdas and his team deliberately opted for two-stage sedimentation: first, coarse particles settle; then finer fractions are removed in the lower section, where aquatic plants and microbial communities continue the treatment. Known as “treatment by design” – this is a process that works without energy-hungry technology. For planning and operation, the team used international SuDS (Sustainable Drainage Systems) standards as guidance. This reduces maintenance needs, stabilises the local ecology and makes future use more reliable. “We learned a great deal from others – and intentionally chose alternative solutions in some areas,” says Langas. “There is no such thing as a copy-and-paste basin, but there are principles that work everywhere.”

The intensive dialogue with the responsible authorities, which was necessary throughout the planning phase, also included drawing up a detailed sampling protocol. Rainfall volumes were measured, water samples were taken, and extensive chemical and microbiological analyses were carried out. A certified laboratory handled this work in line with international standards. The results were very promising: low nutrient levels, no pathogens that pose a health risk, and no legionella. “We continuously monitored the water quality before and after construction. It already meets many of the requirements set out in EU Water Reuse Regulation 2020/741 and in the Lithuanian hygiene standard HN 92:2018,” says Langas.



*Valdas Langas  
Klaipėda University*

Among other things, the international SuDS handbook for sustainable drainage systems served as a reference, with its recommendations on sedimentation basins, permanent water zones, landscape design and maintenance.

“What matters now is time,” says Langas. “An ecosystem has to establish itself; then the retention rate increases, and future uses can be calculated with confidence.”

## UV disinfection could broaden the range of uses

Once the pond ecosystem has stabilised and standardised data series are available, the town will adopt more detailed rules for use, define water extraction



*Mindaugas Šatkus*  
*Klaipėda District Municipality Administration*

points and clarify logistics. In parallel, the region is working to expand legal leeway so that municipal water recycling applications can take their place as a standard tool of climate adaptation.

The first intended use is deliberately pragmatic: cleaning the sewer system. In addition, the treated water is to be used by the so-called “eldership” – the responsible administrative unit – to irrigate public green spaces. In the longer term, further applications are conceivable, ranging from watering newly

planted trees to use as firefighting water. “We have already run our first successful tests, using the water, supplied by our municipal utility, to clean the pipe network,” says Šatkus. The next step is to gradually build up trust in this new practice. The technical implementation, he notes, is often easier than gaining public acceptance. In the medium to long term, additional uses can follow, while extra UV disinfection could further expand the range of applications, for example for washing municipal vehicle fleets.

## **A conscious choice: no fence, but transparency**

With an increasing number of uses, a dedicated operations and quality management plan will be needed: Who extracts how much water, and when? What minimum quality applies to which use? Who documents and who maintains the system?

The pilot is pioneering, however, not only in terms of legislation, authorities, municipal actors and procedures. It is also breaking new ground in how the topic of water recycling is communicated to the general public. It is no coincidence that the retention basin was built without a fence in a central and much-visited area of the town, rather than as an enclosed technical facility somewhere out of sight. Those responsible deliberately decided against a fence and in favour of openness and transparency. Targeted communication activities are also planned: information events, training formats, presentations in schools and community centres, and on-site conversations at the pond itself, turning the site into a place of learning about hydrology, ecology and climate adaptation. The municipality also intends to be active on social media.

## **No compromise on quality, but smarter management of resources**

The aim is to raise awareness of the potential of rainwater as a resource literally lying at our feet. "People need to understand that this is not about compromising on quality, but about managing resources more intelligently," emphasises Šatkus.

In this, Gargždai can draw on the experience of other WaterMan partner regions, such as Kalmar in Sweden. There, it has also become clear that many things are technically feasible – but they also need to be well communicated and socially accepted.

In national debates in Lithuania, critical questions can be expected at first. Why all this effort in a country that has ample groundwater and surface water? The answer lies in the long-term climate data, which tell a clear story: extreme weather events can be expected to increase in Lithuania as well. Here, too, it will no longer be possible to insist on drinking water quality for every use in the future. Instead, a fit-for-purpose approach is needed: the appropriate water quality for each specific use. For the vast majority of applications, drinking water quality is not necessary. People have simply become accustomed to it, because it has long been available in abundance. Retention ponds that also allow direct use of the stored water offer a first, low-threshold path into water recycling – with low maintenance costs.

“We must not lull ourselves into a false sense of security,” says Langas. “Precisely because we still have water in abundance today, we should already be learning to use it responsibly.” What counts here is safety, transparency and practicality. And it takes visionaries who are also pragmatic implementers – people like Valdas Langas, Mindaugas Šatkus and Feliksas Žemgulys.

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## About the WaterMan project

*WaterMan promotes a region specific approach to water recycling, which intends to use the alternation of too much and too little water that has become typical in the Baltic Sea Region to make the local water supply more resilient, and supports municipalities & water companies in adapting their strategies.*

More information: <https://www.eurobalt.org/WaterRecyclingToolbox/>  
<http://interreg-baltic.eu/project/waterman>

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